

MODEL BUILDING CODE AMENDMENT ESTABLISHING SOUND INSULATION STANDARDS*

NOTE: This document includes sound insulation standards designed to provide outdoor-to-indoor noise level reductions (NLR) of 25, 30, and 35 decibels (Sections 4.00, 5.00, and 6.00). Only the standards providing for NLRs of 25 and 30 decibels are recommended for adoption by the City of Scottsdale (Sections 4.00 and 5.00). The other standards are provided as information that the city could provide to any interested builders.

SECTION 1.00. PURPOSE. The purpose of this chapter is to safeguard life, health, property, and public welfare by establishing uniform sound insulation performance standards to protect persons within hotels, motels, apartment houses, attached and detached single-family dwellings, and within other buildings where noise-sensitive activities are affected by excessive aircraft noise at Scottsdale Airport. Effects of airborne noise include but are not limited to persistent interference with speech and sleep. This chapter is intended to be a companion to the adopted zoning ordinance establishing airport compatibility overlay zones and limiting land use in these zones.

SECTION 2.00. DEFINITIONS. The special terms used in these provisions are defined as follows:

2.01. Day-Night Sound Level (DNL): The 24-hour average sound level, in decibels, for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the periods between midnight and 7 a.m. and between 10 p.m. and midnight, local time, as averaged over one year. It is the Federal Aviation Administration's standard metric for determining the cumulative exposure of individuals to noise.

2.02. Decibel (dB): A unit of measure of a sound expressed from a calibrated sound level meter using an A-level weighting scale.

2.03. Noise: Sound from aircraft or other sources which interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying.

2.04. NLR: Outdoor-to-indoor noise level reduction to be achieved through incorporation of sound insulation in structure.

2.05. Interior Noise Level: Sound level of noise in any habitable room with windows and doors closed.

* **SOURCE:**
U.S. Air Force Recommendations for Insulation of Residential Structures Against Aircraft Noise, Undated. As cited in Cleveland Hopkins International Airport F.A.R. Part 150 Noise Compatibility Study, Appendix L.

2.06. OITC Rating: Outdoor Indoor Transmission Class - a description of the noise level reduction, in decibels, achieved by a product or construction assembly. The OITC rating system was developed by the American Society of Testing Materials. It takes into account the influence of environmental noise, such as transportation-related noise, on the product being tested. It takes into account a wider range of frequencies than the STC rating which better reflect the spectrum of exterior noise. This is a new rating system than the STC rating. Increasingly, manufacturers are testing their products using the OITC system.

2.07. STC Rating: Sound Transmission Class - a single number rating of the sound transmission loss (TL-- the reduction of sound energy passing through a building material) of a wall or structure which attempts to account for the variation in TL with frequency. The STC rating system was developed by the American Society of Testing Materials. It is the rating system traditionally used by manufacturers and designers.

SECTION 3.00. SCOPE.

3.01. Structures Requiring Protection: Compliance with these standards shall be required for structures and land uses as noted in the Table of Land Use Compatibility Standards in the Scottsdale Airport Compatibility Overlay Zoning Ordinance.

3.02. Type of Construction Affected: These standards shall apply to new construction of structures and land uses as noted in Subsection 3.01. The standards also shall apply to reconstruction, remodeling, or additions to existing buildings of the types mentioned above when the value of the improvement exceeds 50 percent of the value of the existing structures. Where noise-sensitive activities are carried on in only a portion of new or reconstructed commercial building, only those areas judged noise-sensitive need be protected.

SECTION 4.00. BUILDING REQUIREMENTS FOR A MINIMUM NOISE LEVEL REDUCTION (NLR) OF 25 dB.

4.01. Compliance: Compliance with the following standards shall be deemed to meet the requirements of the Airport Compatibility Overlay Zoning Ordinance for structures in which an NLR of 25 dB is required.

4.02. General:

- a. Brick veneer, masonry blocks, or stucco exterior walls shall be constructed airtightly. All joints shall be grouted or caulked airtightly.
- b. At the penetration of exterior walls by pipes, ducts, or conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar.
- c. Window and/or through-the-wall ventilation units shall not be used.
- d. Through-the-wall/door mail boxes shall not be used.

4.03. Exterior Walls:

- a. Exterior walls other than as described in this Subsection shall have a laboratory sound transmission class rating of at least STC-39. (See Table 1 at the end of this Chapter for examples.)
- b. Masonry walls having a surface weight of at least 25 pounds per square foot do not require a furred (stud) interior wall. At least one surface of concrete block walls shall be plastered or painted with heavy "bridging" paint.
- c. Stud walls shall be at least four inches in nominal depth and shall be finished on the outside with siding-on-sheathing, stucco, or brick veneer.
 - (1) Interior surface of the exterior walls shall be of gypsum board or plaster at least 1/2-inch thick, installed on the studs.
 - (2) Continuous composition board, plywood, or gypsum board sheathing at least 1/2-inch thick shall cover the exterior side of the wall studs behind wood, or metal siding. Asphaltic or wood shake shingles are acceptable in lieu of siding.
 - (3) Sheathing panels shall be butted tightly and covered on the exterior with overlapping building paper. The top and bottom edges of the sheathing shall be sealed.
 - (4) Insulation material at least two inches thick shall be installed continuously throughout the cavity space behind the exterior sheathing and between wall studs. Insulation shall be glass fiber or mineral wool.

4.04. Windows:

- a. Windows other than as described in this Subsection shall have a laboratory sound transmission class rating of at least STC-28. (See Table 2.)
- b. Glass shall be at least 3/16-inch thick.
- c. All operable windows shall be weather-stripped and airtight when closed so as to conform to an air infiltration test not to exceed 0.5 cubic foot per minute per foot of crack length in accordance with ASTM E-283-65-T.
- d. Glass of fixed-sash windows shall be sealed in an airtight manner with a non-hardening sealant, or a soft elastomer gasket or glazing tape.
- e. The perimeter of window frames shall be sealed airtightly to the exterior wall construction with a sealant conforming to one of the following Federal Specifications: TT-S-00227, TT-S-00230, or TT-S-00153.

- f. The total area of glass in both windows and doors in sleeping spaces shall not exceed 20 percent of the floor area.

4.05. Doors:

- a. Doors, other than as described in this Subsection, shall have a laboratory sound transmission class rating of at least STC-28. (See Table 3.)
- b. All exterior side-hinged doors shall be solid-core wood or insulated hollow metal at least 1-3/4-inch thick and shall be fully weather-stripped.
- c. Exterior sliding doors shall be weather-stripped with an efficient airtight gasket system with performance as specified in Paragraph 4.04.c. The glass in the sliding doors shall be at least 3/16-inch thick.
- d. Glass in doors shall be sealed in an airtight non-hardening sealant, or in a soft elastomer gasket or glazing tape.
- e. The perimeter of door frames shall be sealed airtightly to the exterior wall construction as described in Paragraph 4.04.e.

4.06. Roofs:

- a. Combined roof and ceiling construction other than described in this Subsection and Subsection 4.07 shall have a laboratory sound transmission class rating of at least STC-39.
- b. With an attic or rafter space at least six-inches deep, and with a ceiling below, the roof shall consist of closely butted 1/2-inch composition board, plywood, or gypsum board sheathing topped by roofing as required.
- c. If the underside of the roof is exposed, or if the attic or rafter spacing is less than six inches, the roof construction shall have a surface weight of at least 25 pounds per square foot. Rafters, joists, or other framing may not be included in the surface weight calculation.
- d. Window or dome skylights shall have a laboratory sound transmission class rating of at least STC-28. (See Table 2.)

4.07. Ceilings:

- a. Gypsum board or plaster ceilings at least 1/2-inch thick shall be provided where required by Paragraph 4.06.b above. Ceilings shall be substantially airtight, with a minimum number of penetrations.
- b. Glass fiber or mineral wool insulation at least two inches thick shall be provided above the ceiling between joists.

4.08. Floors:

- a. Openings to any crawl spaces below the floor of the lowest occupied rooms shall not exceed two percent of the floor area of the occupied rooms.

4.09. Ventilation:

- a. A mechanical ventilation system shall be installed that will provide the minimum air circulation and fresh air supply requirements for various uses in occupied rooms without the need to open any windows, doors, or other openings to the exterior.
- b. Gravity vent openings in the attic shall not exceed the code minimum in number and size.
- c. If a fan is used for forced ventilation, the attic inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with one-inch thick coated glass fiber, and shall be at least five feet long with one 90-degree bend.
- d. All vent ducts connecting the interior space to the outdoors, excepting domestic range exhaust ducts, shall contain at least a five-foot length of internal sound absorbing duct lining. Each duct shall be provided with a bend in the duct such that there is no direct line of sight through the duct from the venting cross-section to the room-opening cross-section.
- e. Duct lining shall be coated glass fiber duct liner at least one-inch thick.
- f. Domestic range exhaust ducts connecting the interior space to the outdoors shall contain a baffle plate across the exterior termination which allows proper ventilation. The dimensions of the baffle plate shall extend at least one diameter beyond the line of sight into the vent duct. The baffle plate shall be of the same material and thickness as the vent duct material.
- g. Fireplaces shall be provided with well-fitted dampers.

SECTION 5.00. BUILDING REQUIREMENTS FOR A MINIMUM NOISE LEVEL REDUCTION (NLR) OF 30 dB.

5.01. *Compliance:* The following standards are provided for information only. Compliance with these standards is assumed to achieve an NLR of 30 dB.

5.02. General:

- a. Brick veneer, masonry blocks, or stucco exterior walls shall be constructed airtightly. All joints shall be grouted or caulked airtightly.

- b. At the penetration of exterior walls by pipes, ducts, conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar.
- c. Window and/or through-the-wall ventilation units shall not be used.
- d. Operational vented fireplaces shall not be used.
- e. All sleeping spaces shall be provided with either a sound-absorbing ceiling or a carpeted floor.
- f. Through-the-wall/door mailboxes shall not be used.

5.03. Exterior Walls:

- a. Exterior walls other than as described in this Subsection shall have a laboratory sound transmission class rating of at least STC-44. (See Table 1).
- b. Masonry walls having a surface weight of at least 40 pounds per square foot do not require a furred (stud) interior wall. At least one surface of concrete block walls shall be plastered or painted with heavy "bridging" paint.
- c. Stud walls shall be at least four inches in nominal depth and shall be finished on the outside with siding-on-sheathing, stucco, or brick veneer.
 - (1) Interior surface of the exterior walls shall be of gypsum board or plaster at least 1/2-inch thick, installed on the studs. The gypsum board or plaster may be fastened rigidly to the studs if the exterior is brick veneer or stucco. If the exterior is siding-on-sheathing, the interior gypsum board or plaster must be fastened resiliently to the studs.
 - (2) Continuous composition board, plywood, or gypsum board sheathing shall cover the exterior side of the wall studs behind wood, or metal siding. The sheathing and facing shall weigh at least four pounds per square foot.
 - (3) Sheathing panels shall be butted tightly and covered on the exterior with overlapping building paper. The top and bottom edges of the sheathing shall be sealed.
 - (4) Insulation material at least two inches thick shall be installed continuously throughout the cavity space behind the exterior sheathing and between wall studs. Insulation shall be glass fiber or mineral wool.

5.04. Windows:

- a. Windows other than as described in this Subsection shall have a laboratory sound transmission class rating of at least STC-33. (See Table 2).

- b. Glass of double-glazed windows shall be at least 1/8-inch thick. Panes of glass shall be separated by a minimum three-inch air space.
- c. Double-glazed windows shall employ fixed sash or efficiently weather-stripped operable sash. The sash shall be rigid and weather-stripped with material that is compressed airtightly when the window is closed so as to conform to an infiltration test not to exceed 0.5 cubic foot per minute per foot of crack length in accordance with ASTM E-283-65-T.
- d. Glass of fixed-sash windows shall be sealed in an airtight manner with a non-hardening sealant, or a soft elastomer gasket or glazing tape.
- e. The perimeter of window frames shall be sealed airtightly to the exterior wall construction with a sealant conforming to one of the following Federal Specifications: TT-0227, TT-S-00230, or TT-S-00153.
- f. The total area of glass of both windows and exterior doors in sleeping spaces shall not exceed 20 percent of the floor area.

5.05. *Doors:*

- a. Doors, other than as described in this Subsection, shall have a laboratory sound transmission class rating of at least STC-33. (See Table 3.)
- b. Double door construction is required for all door openings to the exterior. Openings fitted with side-hinged doors shall have one solid-core wood or insulated hollow metal core door at least 1 3/4-inch thick separated by an airspace of at least four inches from another door, which can be a storm door. Both doors shall be tightly fitted and weather-stripped.
- c. The glass of double-glazed sliding doors shall be separated by a minimum four-inch airspace. Each sliding frame shall be provided with an efficiently airtight weather-stripping material as specified in Paragraph 5.04.c.
- d. Glass of all doors shall be at least 3/16-inch thick. Glass of double sliding doors shall not be equal in thickness.
- e. The perimeter of door frames shall be sealed airtightly to the exterior wall construction as indicated in Subsection 5.04.e.
- f. Glass of doors shall be set and sealed in an airtight non-hardening sealant, or a soft elastomer gasket or glazing tape.

5.06. *Roofs:*

- a. Combined roof and ceiling construction other than described in this Subsection and Subsection 5.07. shall have a laboratory sound transmission class rating of at least STC-44.

- b. With an attic or rafter space at least six inches deep, and with a ceiling below, the roof shall consist of closely butted 1/2-inch composition board, plywood, or gypsum board sheathing topped by roofing as required.
- c. If the underside of the roof is exposed, or if the attic or rafter spacing is less than six inches, the roof construction shall have a surface weight of at least 40 pounds per square foot. Rafters, joists, or other framing may not be included in the surface weight calculation.
- d. Window or dome skylights shall have a laboratory sound transmission class rating of at least STC-33. (See Table 2.)

5.07. Ceilings:

- a. Gypsum board or plaster ceilings at least 1/2-inch thick shall be provided where required by Paragraph 5.06.b above. Ceilings shall be substantially airtight, with a minimum number of penetrations.
- b. Glass fiber or mineral wool insulation at least two inches thick shall be provided above the ceiling between joists.

5.08. Floors:

The floor of the lowest occupied rooms shall be slab on fill, below grade, or over a fully enclosed basement. All door and window openings in the fully enclosed basement shall be tightly fitted.

5.09. Ventilation:

- a. A mechanical ventilation system shall be installed that will provide minimum air circulation and fresh air supply requirements for various uses in occupied rooms without the need to open any windows, doors, or other openings to the exterior.
- b. Gravity vent openings in attic shall not exceed code minimum in number and size. The openings shall be fitted with transfer ducts at least three feet in length containing internal sound absorbing duct lining. Each duct shall have a lined 90-degree bend in the duct such that there is no direct line of sight from the exterior through the duct into the attic.
- c. If a fan is used for forced ventilation, the attic inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with one-inch thick coated glass fiber, and shall be at least five feet long with one 90-degree bend.
- d. All vent ducts connecting the interior space to the outdoors, excepting domestic range exhaust ducts, shall contain at least a 10-foot length of internal sound absorbing duct lining. Each duct shall be provided with a lined 90-degree bend in the duct such that there is no direct line of sight through the duct from the venting cross-section to the room opening cross-section.

- e. Duct lining shall be coated glass fiber duct liner at least one-inch thick.
- f. Domestic range exhaust ducts connecting the interior space to the outdoors shall contain a baffle plate across the exterior termination which allows proper ventilation. The dimensions of the baffle plate shall extend at least one diameter beyond the line of sight into the vent duct. The baffle plate shall be of the same material and thickness as the vent duct material.
- g. Building heating units with flues or combustion air vents shall be located in a closet or room closed off from the occupied space by doors.
- h. Doors between occupied space and mechanical equipment areas shall be solid core wood or 20 gauge steel hollow metal at least 1 3/4-inch thick and shall be fully weather-stripped.

SECTION 6.00. BUILDING REQUIREMENTS FOR A MINIMUM NOISE LEVEL REDUCTION (NLR) OF 35 dB.

6.01. *Compliance.*

These standards are provided for information only. Compliance with these standards is assumed to achieve an NLR of 35 dB.

6.02. *General:*

- a. Brick veneer, masonry blocks, or stucco exterior walls shall be constructed airtightly. All joints shall be grouted or caulked airtightly.
- b. At the penetration of exterior walls by pipes, ducts, or conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar.
- c. Window and/or through-the-wall ventilation units shall not be used.
- d. Operational vented fireplaces shall not be used.
- e. All sleeping spaces shall be provided with either a sound absorbing ceiling or a carpeted floor.
- f. Through-the-wall/door mailboxes shall not be used.
- g. No glass or plastic skylight shall be used.

6.03. Exterior Walls:

- a. Exterior walls other than as described in this Subsection shall have a laboratory sound transmission class rating of at least STC-49. (See Table 1.)
- b. Masonry walls having a surface weight of at least 75 pounds per square foot do not require a furred (stud) interior wall. At least one surface of concrete block walls shall be plastered or painted with heavy "bridging" paint.
- c. Stud walls shall be at least four inches in nominal depth and shall be finished on the outside with siding-on-sheathing, stucco, or brick veneer.
 - (1) Interior surface of the exterior walls shall be of gypsum board or plaster at least 1/2-inch thick, installed on studs. The gypsum board or plaster may be fastened rigidly to the studs if the exterior is brick veneer. If the exterior is stucco or siding-on-sheathing, the interior gypsum board or plaster must be fastened resiliently to the studs.
 - (2) Continuous composition board, plywood, or gypsum board sheathing shall cover the exterior side of the wall studs behind wood or metal siding. The sheathing and facing shall weigh at least four pounds per square foot.
 - (3) Sheathing panels shall be butted tightly and covered on the exterior with overlapping building paper. Top and bottom edges of the sheathing shall be sealed.
 - (4) Insulation material at least 3-1/2-inches thick shall be installed continuously through the cavity space behind the exterior sheathing and between wall studs. Insulation shall be glass fiber or mineral wool.

6.04. Windows:

- a. Windows other than as described in this Subsection shall have a laboratory sound transmission class rating of at least STC-38. (See Table 2.)
- b. Double-glazed windows shall employ fixed sash. Glass of double-glazed windows shall be at least 1/8-inch thick. Panes of glass shall be separated by a minimum three-inch space and shall not be equal in thickness.
- c. Glass of windows shall be sealed in an airtight manner with a non-hardening sealant, or a soft elastomer gasket or glazing tape.
- d. The perimeter of window frames shall be sealed airtightly to the exterior wall construction with a sealant conforming to one of the following Federal Specifications: TT-S-00227, TT-S-00230, or TT-S-00153.
- e. The total area of glass of both windows and exterior doors in sleeping spaces shall not exceed 20 percent of the floor area.

6.05. Doors:

- a. Doors, other than as described in this Subsection, shall have a laboratory sound transmission class rating of at least STC-38. (See Table 3.)
- b. Double door construction is required for all door openings to the exterior. The door shall be side-hinged and shall be solid-core wood or insulated hollow metal, at least 1 3/4-inch thick, separated by a vestibule at least three feet in length. Both doors shall be tightly fitted and weather-stripped.
- c. The perimeter of door frames shall be sealed airtightly to the exterior wall construction as specified in Paragraph 6.04.d.

6.06. Roofs:

- a. Combined roof and ceiling construction other than described in this Subsection shall have a laboratory sound transmission class rating of at least STC-49.
- b. With an attic or rafter space at least six inches deep, and with a ceiling below, the roof shall consist of closely butted 1/2-inch composition board, plywood, or gypsum board sheathing topped by roofing as required.
- c. If the underside of the roof is exposed, or if the attic or rafter spacing is less than six inches, the roof construction shall have a surface weight of at least 75 pounds per square foot. Rafters, joists, or other framing may not be included in the surface weight calculation.

6.07. Ceilings:

- a. Gypsum board or plaster ceilings at least 1/2-inch thick shall be provided where required by Subsection 6.06. Ceilings shall be substantially airtight, with a minimum number of penetrations. The ceiling panels shall be mounted on resilient clips or channels. A non-hardening sealant shall be used to seal gaps between the ceiling and walls around the ceiling perimeter.
- b. Glass fiber or mineral wool insulation at least 3-1/2 inches thick shall be provided above the ceiling between joists.

6.08. Floors:

The floors of the lowest occupied rooms shall be slab on fill or below grade.

6.09. Ventilation:

- a. A mechanical ventilation system shall be installed that will provide the minimum air circulation and fresh air supply requirements for various uses in occupied rooms without need to open any windows, doors, or other openings to the exterior.

- b. Gravity vent openings in attic shall not exceed code minimum in number and size. The openings shall be fitted with transfer ducts at least six feet in length containing internal sound absorbing duct lining. Each duct shall have a lined 90-degree bend in the duct such that there is no direct line of sight from the exterior through the duct into the attic.
- c. If a fan is used for forced ventilation, the attic inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel, which shall be lined with one-inch thick coated glass fiber, and shall be at least 10 feet long with one 90-degree bend.
- d. All vent ducts connecting the interior space to the outdoors excepting domestic range exhaust ducts, shall contain at least 10 feet length of internal sound absorbing duct lining. Each duct shall be provided with a lined 90-degree bend in the duct such that there is no direct line of sight through the duct from the venting cross-section to the room-opening cross-section.
- e. Duct lining shall be coated glass fiber duct liner at least one-inch thick.
- f. Domestic range exhaust ducts connecting the interior space to the outdoors shall contain a baffle plate across the exterior termination which allows proper ventilation. The dimensions of the baffle plate shall extend at least one diameter beyond the line of sight into the vent duct. The baffle plate shall be of the same material and thickness as the vent duct material.
- g. Building heating units with flues or combustion air vents shall be located in a closet or room closed off from the occupied space by doors.
- h. Doors between occupied space and mechanical equipment areas shall be solid-core wood or 20 gauge steel hollow metal at least 1 3/4-inches thick and shall be fully weather-stripped.

TABLE 1
SOUND TRANSMISSION CLASS (STC)
OF SOME COMMON EXTERIOR WALL CONSTRUCTIONS

Description		Weight lbs./ft. ²	STC
(a)	Stucco on wire lath over tar paper. Wood studs, 16 in. o.c., 5/8 in. gypboard on inside face of studs.	5.0	39
(b)	Same as (a), but staggered studs	5.2	46
(c)	Common curtainwall spandrel panel; 16 ga. sheet metal exterior with insulation and 5/8 in. gypboard interior	7.8	41
(d)	4-1/2 in. brick - 1/2 in. plaster both sides	55	48
(e)	4 in. light weight concrete block unpainted	24	29
(f)	4 in. lightweight concrete block sealed with two coats of paint	24	45
(g)	Same as (e), but 8 in. dense	50	55
(h)	Same as (f), but 8 in. dense	50	55
(i)	4 in. dense poured concrete	50	51
(j)	8 in. dense poured concrete	100	57
(k)	Fluted 18 ga. sheet metal for prefabricated building	4.4	28
Source: Santa Clara County Airport Land Use Commission (ALUC), Land Use Plan for Area Surrounding Santa Clara County Airports, County of Santa Clara (CA) Planning Department, August 1973.			

TABLE 2
SOUND TRANSMISSION CLASS (STC)
OF SOME COMMON WINDOW CONSTRUCTION AND MATERIALS

Description		Weight lbs./ft. ²	STC
(a)	Double-hung window, wood frame, 3/32-in. glass	--	23
(b)	Louvered window, 1/4-in. window glass	--	17
(c)	Aluminum sliding window, 3/32-in. glass	--	19
(d)	Steel frame, casement window, 3/32-in. glass	--	21
(e)	Approximate limit of TL for (a) through (d) if caulked and permanently sealed	--	27
(f)	Approximate TL for constructions (a) through (d) if new 1/4-in. plate is added in separate frame. Old window sealed, min. 2-1/2 in. airspace	--	42
(g)	Double-glazed aluminum window 7/32-in. and 1/4-in. glass; 2-1/2 in. airspace	--	43
(h)	1/8-in. sheet glass, sealed	1.6	31
(i)	1/4-in. plate glass, sealed	3.2	32
(j)	1/4-in. acoustic glass, sealed	3.2	35
(k)	1/2-in. acoustic glass, sealed	3.2	35
(l)	1/4-in. - 3/16-in. glass in neoprene gasket aluminum frames; 2-1/2 in. airspace	5.7	41
(m)	Same as (l), but 1/4-in. - 7/32-in. glass; 3-3/4 in. airspace	6.1	49
(n)	3-5/8 in. thick glass blocks	--	43

Source: Santa Clara County Airport Land Use Commission (ALUC), Land Use Plan for Area Surrounding Santa Clara County Airports, County of Santa Clara (CA) Planning Department, August 1973.